Colorado Multi-Family Housing Programs
Landscape Development Policy: Appendix

Xeriscape Handbook
for Apartment Complexes

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What is Xeriscape?

Xeriscape is a derivation of the Greek word, “xeros”, meaning “dry”. When combined with “landscape”, xeriscape represents a form of landscaping that is very water efficient. Following are the seven commonly defined fundamental ideas behind Xeriscaping:

- Provide a good design at the start of the project.
- Improve existing soil properties as necessary.
- Locate lawns very strategically and consider all alternatives to lawns.
- Use mulches to moderate soil temperatures and to conserve moisture.
- Utilize plants that are native or well adapted to geographical/climatic conditions.
- Water efficiently.
- Provide regular landscape maintenance.

By putting these ideas into practice, an apartment complex’s water usage can be reduced dramatically, especially during sustained hot, dry weather—without sacrificing a healthy landscape in the process!

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Xeriscape Objective

The U.S. Department of Agriculture/Rural Development, Colorado State Office, strongly believes that there is a need to strengthen and improve the quality of life for the rural participants of the agency's lending programs. Colorado has a semi-arid environment where water for site irrigation purposes has traditionally been scare and, therefore, especially valuable. Competition has been severe at times between the interests of agriculture, large urban areas, recreational enterprises, and rural communities, many of which are themselves located close to the sources of water. If the hydrologic interests of all these entities are to be broadly accommodated, all will need to cooperate with special water conservation practices, such as Xeriscape.

The types of plant materials traditionally employed for landscaping agency-financed apartment projects within Colorado have typically consumed relatively large amounts of irrigation water. An example is the propensity to install as much Kentucky Bluegrass seed mix as possible across landscapes. This emanated from the historical population migration to the West from the Eastern United States where this practice was common and well supported by the indigenous climatology there. In Colorado this practice eventually became standardized by market forces.

It, unfortunately, has been accompanied by high maintenance costs, often leading to the gradual degradation of projects' overall landscaping aesthetics. Irrigation water prices and availability have been a large component of these high expense outlays as they have been strongly

influenced by unpredictable drought cycles, variable legal water exchanges, and other factors beyond the control of project owners. It seems both timely and prudent, therefore, to evaluate the agency's current and future portfolio in this light and search for new and innovative solutions with an emphasis on water conservation and extended low maintenance.



Xeriscape appears to offer promise toward achieving these objectives. It has been formally integrated into the planning and zoning requirements of many communities across Colorado, all sharing the same goals and responsibilities.

The Rural Development, Colorado State Office, has, thus, produced the following guidance manual, with the appreciated assistance of the U.S. Department of Agriculture, National Resource Conservation Service, Colorado State Office, to aid project developers, owners, and managers in working to establish lower water consumption and lower long-term maintenance landscaped environments. This handbook is intended to briefly introduce the concept and the practical implementation of Xeriscape to hopefully "open the floodgates" of creativity. With good planning and a little help from "Mother Nature", this could definitely be a win/win proposition.

Good luck with your creative endeavors!!

-the Colorado Multifamily Housing Staff

The Evolution of the Apartment Landscape

We've all been there. The apartment project is being designed and what is the first feature selected for serious budget cutting?

No! After the artwork!

No! After the carports!

What? The Jacuzzi?

O.K. The growies.

So the project is finally built with mostly sodded lawns and plastic edging, some gravel beds, five 1-1/2" caliper deciduous trees, fifteen 5-gallon shrubs, two molded fiberglass playground action toys with one aluminum climber, and a multi-zoned automatic sprinkler system with pop-up heads.

…..

No worries. Everything has pretty much been considered and we now have a foundation to start with. In ten or fifteen years the trees and shrubs will be pretty large. Maybe we can even add an extra tree or shrub every five years or so. Lots of good intentions are everywhere and the new sod looks "marvelous".

Perhaps a common scenario for many apartment project landscapes during the planning and start-up phases.
But what about five years later?

Yard maintenance has probably become very routine now. After the first couple years, most of the plant materials were finally “established” and disciplined watering, pruning, fertilizing, deweeding, gravel bed cleaning, and irrigation system repair regimes were gradually slackened. The project’s users have probably started defining their own short-cut pedestrian routes similar to the practice at any school campus…..

Simple watering and fertilizing now appear to net much larger trees and still fairly robust shrubs. The lawns are not quite as dark green as they were when installed but they still appear fairly thick, except near sidewalk corners, on the hotter sides of the buildings, and at some poor drainage spots.

“Yeah, they have some thin spots but the water rate has been steadily climbing…..and we have to think about building maintenance too.”

“Might address that by yanking out some sod and putting in some flower beds. No, wait a minute, that’s high maintenance. I know, maybe some gravel beds with some large landscaping rocks?”

“Some landscaping benches would be nice too, but some lawn area would have to go to get them in…. You know, that could have been provided when this place was originally built!”

“The dirt paths could be eliminated if some large rocks were placed smack in the center of them…..maybe about ten feet apart? Well, what about we just pave them over?”

“You know, I like that. Straighten them out…..or, hold it! What about a nice serpentine walk??? Hey, we’re always thinking here!

Wow, evolution sets in fast!!!”

The Importance of Planning Ahead

Many site factors influence landscaping design and even the best front-end intentions cannot guarantee a project's landscaping success as circumstances evolve. Still, smart planning can make great strides with respect to achieving proper aesthetics, human interest, water conservation, and maintainability. Typically, the initial design will have the greatest single impact on optimizing the solution. Otherwise, it's a retrofitting game. Even so, ultimate landscapes can be achieved in phases.

We all would like to see this - with mucho $$$$$$$$$…..

But, within realistic budget constraints, we might be able to achieve this - with minimal to moderate $…..

The Seven Principles of the Xeriscape Landscape

Xeriscape landscapes start with planning ahead and are guided by the following seven commonly defined principles:

1. PLAN UP FRONT

- Consider site constraints (sun angles, views, etc.).
- Consider owner and tenant expectations and emphases.

2. IMPROVE THE SOIL

- Loosen and aerate the topsoil.
- Supplement the soil nutrients with fertilizer, manure, compost, etc.

3. USE LAWN ALTERNATIVES

- Limit lawns to high activity areas (recreational fields, etc.).
- Segregate lawns for more intense watering regimes.
- Consider alternatives to lawns (mulches, ground covers, etc.)

4. USE MULCH

- Mulch lowers evaporation loss and cools the soil during summer.
- Mulch stores solar energy and insulates the soil during winter.
- Mulch, when applied thickly, suppresses weed growth.
- Mulch beds are a good choice for lawn replacement.

5. USE PLANT MATERIALS WITH LOW WATER REQUIREMENTS

- Each plant species has different watering requirements.
- Consider native plant species that are drought tolerant.
- Consider related requirements (seasonal color, mature size, etc.)

6. IRRIGATE EFFICIENTLY

- Design irrigation systems with multiple zones.
- Place lawn irrigation systems on separate zones.
- Irrigate specific to plant species watering requirements.
- Consider drip irrigation systems.
- Limit watering to the coolest times of the day.

7. MAINTAIN THE LANDSCAPE APPROPRIATELY

- Clean, weed, prune, fertilize, water, repair, etc. as needed.

Definitions

Acidic soils: Soils with a pH value less than 7.0. The term usually is referring to the surface layer and root zone soil stratas.

Aeration: A process that removes soil plugs to create more space for air in the soil.

Alkaline soils: Soils with a pH value greater than 7.0. The term is usually only referring to the surface layer soil strata.

Annual plants: Plants that complete their life cycles and die in one year or less.

Arid: Regions or climates that lack sufficient moisture for crop production. The limits of precipitation vary according to temperature conditions with an upper annual limit for cool regions as much as 15 to 20 inches.

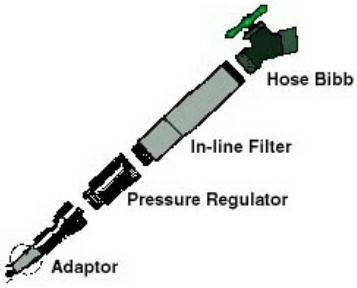
Arid conditions @ Great Sand Dunes National Monument, near Alamosa, Colorado

Clays: Pliable, fine grained soil types. The soil particles are less than .002 millimeters in diameter.

Deciduous plants: Plants that shed all their leaves every year during a certain season.

Drip irrigation: A low-pressure system approach to watering that is growing in popularity. There are many advantages inherent in a drip irrigation system, including the reduction of water usage by almost 50%. In addition, the lengthy, slow trickle provided by a drip system has increased yields by 84% over other methods of watering, and as high as 30 to 50% in areas with a high amount of summer rain. Drip irrigation also alleviates problems created by improper watering, which can harm plants' soil conditions, leading to the growth of detrimental fungi.

variable volume emitters



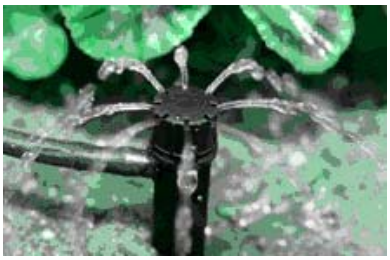
system hook-up

directional sprayer

microtubing (perforated)

microtubing manifolds

mister



variable volume sprinkler

Some common low pressure drip irrigation system components

Drought: A meteorological term referring to a lack of precipitation.

Evergreen plants: Plants that are never entirely without green foliage.

Fertilizers: Organic or inorganic materials of natural or synthetic origins that are added to soils to supply elements necessary for plants' growth.

Grades/gradients: Slopes of roads, channels, or natural ground surfaces. Indicated on topographic surveys and site grading and drainage plans by contour lines and spot gradients.

Growing season: The period of days between the last freeze in the spring and the first frost in the fall.

Inorganic: Not composed of or involving living organisms or their remains or products, such as rocks or minerals. In scientific terms, materials that do not contain carbon compounds.

Irrigation: The application of water to land for the purpose of growing plants.

Landscape: All natural features, such as slopes, annuals, perennials, ground covers, shrubs, and trees across the project site.

Loams: Soils that chiefly contain sand, silt, clay, and organic matter.

Native: A species that is part of an area's original flora.

Nursery: A place where plants, such as shrubs, trees, vines, grasses, and flowers are propagated for transplanting or for use as stocks for grafting.

Paths: Paths play critical roles in tenants' lives, both for reaching goals and for the inherent pleasure of taking a walk. For designers, paths and walkways take on added significance as both functional and aesthetic elements in any design. Paths demand continuity. A truncated path is no path at all. An adequate number of paths at key locations should be provided across projects to insure there will be no room for "natural paths".

Perennial plants: Plants that live normally for three (3) or more years.

Pole peelings: Wood shavings left from sizing pieces of wood in carpentry. These can be used as mulch.

Precipitation: A general term for all forms of falling moisture, including, rain, snow, sleet, and hail.

Saline soils: Soils containing sufficient quantities of salts to impair the soils' productivity.

Semi-arid: A term applied to regions or climates where the natural moisture is normally greater than that for an arid condition but still limits the growth of most plants.

Upper Gunnison River valley, Colorado, exhibiting semi-arid and wetland conditions

Shrub: A wood/perennial plant differing from a tree by its relatively low structure and by generally producing more than one trunk.

Soil amendment: Any material, such as compost, peat moss, or manures, that is worked into the soil to make it more amenable to plant growth.

Soil texture: The basic make-up and structure of a soil:

Sand:	Soil material that contains 85% or more of sands
Loam:	Soil materials that contain a mixture of clay, silt, and sand
Clay:	Soil materials that contain 40% or more of clays, less than 45% of silts
Silt:	Soil material that contains 80% or more of silts and less than 12% of clays

Terrain: The physical features of a piece of land, such as hills, arroyos, bluffs, lakes, etc.

Topography/topographic: Referring to the configuration of the ground surface, including its relief and the positions of its natural and man-made features.

Three-dimensional topographic site model

Tree: A wood/perennial plant differing from a shrub by its relatively high structure and by generally producing only a single trunk.

Vegetation: Plants in general or the sum total of plant life in an area.

Landscape Vernaculars

Many landscape vernaculars exist in different climatological and geographic locations within Colorado, influenced by topography, prevailing winds, altitude, watersheds, and other natural elements. Colorado natural landscapes vary from temperate arid to Alpine, permitting farming in some areas and skiing in others. This diversity both restricts and promotes potential artificial landscaping options at apartment projects. While the length of the growing season and historical precipitation limit the selection of plant materials, the interjection of controlled site irrigation and maintenance permits several landscaping vernaculars to be supported at complexes, either complimenting or contrasting with the indigenous surroundings, as desired by project owners.

A typical Colorado natural Alpine landscape during the summer season

Three landscape vernaculars have proven well adapted to most Colorado locales, provided adequate consideration is given to the subtle selection of plant materials, and appear very achievable through Xeriscape methods.

- The traditional landscape
- The western landscape
- The gardener's landscape

Each offers its own advantages and results in a distinct aesthetic statement. Each is dependent on different maintenance resources. Each may be more appropriate for a certain project based on the types of tenants involved, the site's surroundings (i.e. to open up or to mask views), and other factors. A portion of all landscape designs will always be subjective. Following is a brief discussion of three potential vernaculars.

The Traditional Landscape

A well-established Colorado landscaping idiom might be termed, “the traditional landscape”, a western evolution of precedents long established in the eastern United States. It fairly easily facilitates many traditional apartment complex site functions, including, but not limited to: vehicular parking, active and passive recreation, social gathering, pedestrian walking trails, gardening, ornamental plants, privacy, formal site entry, and administration. It often employs plants to provide screens, where needed, and to define boundaries. It involves relatively higher maintenance and watering requirements than other landscaping vernaculars and is more suitable for higher traffic projects, such as apartment complexes for families.

Potential plant varieties: (Climatic zone & soil type dependent)

Trees:
- Ponderosa Pine
- Purple Chokecherry

Shrubs:
- Lilac
- Dwarf Lilac
- Harrison’s Yellow Rose
- New Mexican Privet

Ground covers:
- Creeping Mahonia

Flowers:
- Various common annuals

Grasses:
- Buffalo Grass (low traffic & non-shade areas)
- Tall Fescue

The Western Landscape

A more prevalent and indigenous dry landscaping idiom in the southwestern United States might be termed, “the western landscape”, which employs plant materials that are common to the western United States to accommodate typical apartment site functions. It tends to require significantly less water consumption for irrigation; be more drought resistant; and require less maintenance (once established) than other landscaping vernaculars. Lawn areas are especially restricted to high traffic areas and located to establish cool zones for the summer season. Water thrifty native grass mixes are typically seeded, requiring high initial maintenance during establishment, then, lower maintenance for the duration. The western landscape is more fragile and is more suitable for lower traffic projects, such as apartment complexes for the elderly.



Potential plant varieties: (Climatic zone & soil type dependent)

Trees:
- Ponderosa Pine
- New Mexico Locust
- Rocky Mountain Maple

Shrubs:
- Rabbitbrush
- Yucca
- Winterfat

Vines:
- Silver Lace Vine

Ground covers:
- Hens & Chicks

Flowers:
- Coralbells

Grasses:
- Blue Avena Grass (ornamental)
- Low-Grow, No-mow Mix with Wildflowers

The Gardener's Landscape

Another more eclectic landscaping regime might be termed, "the gardener's landscape", that is an adaptation of the traditional landscape and the western landscape with an emphasis on providing an actual area dedicated for vegetable gardening (i.e. for harvesting by tenants) and/or for floral gardening (i.e. by tenants and grounds maintenance crews) for a potentially more lush aesthetic presentation. It introduces an additional site recreational activity at the expense of higher water consumption and maintenance requirements. It is also a delicate environment and more suitable for lower traffic projects, such as apartment complexes for the elderly.

Potential plant varieties: (Climatic zone & soil type dependent)

Trees:
- Rocky Mountain Sugar Maple
- Cockspur Hawthorn

Shrubs:
- Viburnium Lantana
- Spreading Juniper
- Fern Bush

Vines:
- Silver Lace Vine
- Morning Glory

Ground covers:
- Wooly Thyme

Flowers:
- Cosmos
- Sunflowers
- Garden Sage
- Orange Daylily
- Nasturtium
- Mexican Hat
- Creeping Zinnia

Grasses:
- Buffalo Grass
- Tall Fescue

Plant Materials Photo Gallery

[Alphabetical Listing of plant materials listed in "Landscape Vernaculars"]

Annuals

Blue Avena Grass (ornamental)

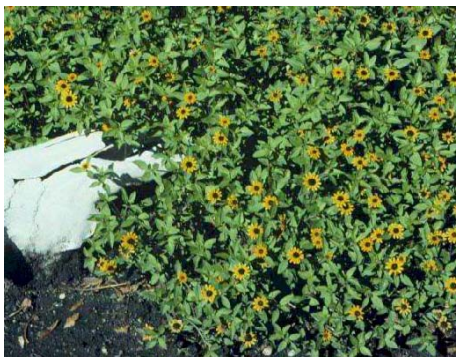
Buffalo Grass

Cockspur Hawthorn

Coralbells

Cosmos

Creeping Mahonia



Creeping Zinnia

Dwarf Lilac

Fern Bush

Garden Sage

Harrison's Yellow Rose

Hens & Chicks

Lilac

Low-Grow, No-Mow Grass

Mexican Hat

Morning Glory

Nasturtium

New Mexican Privet

New Mexico Locust

Orange Daylily

Ponderosa Pine

Purple Chokecherry

Rabbitbrush

Rocky Mountain Maple

Silver Lace Vine

Spreading Juniper

Sunflowers

Tall Fescue

Viburnium Lantana

Winterfat

Wooly Thyme

Yucca

And many others….

Step-by-Step Design: Overview

Creating or recreating a vigorous Xeriscape landscape across an apartment complex is more successfully achieved utilizing a methodical, step-by-step process, such as the following illustrated example. It initializes with a self-questionnaire to identify shortcomings and establish objectives and it concludes with the development of a budget to determine attainability. It recognizes that multiple factors (i.e. function, aesthetics, community, budget, etc.) must be considered objectively and subjectively to create character and establish/improve marketability. Seeking professional advice (i.e. nurseries, landscape architects, landscape contractors, governmental expert agencies, etc.) is encouraged at all stages of the development process, but is especially critical during the design phases where climatic and soil conditions must be thoroughly evaluated at a technical level. The bibliographical references provided at the end of this document may be used as a starting point for locating such professional assistance.

The following sections of this guide present an exercise that attempts to illustrate the complete Xeriscape design process in a chronological sequence. A graphic example of the evolution of the landscaping of a prototypical, existing, apartment complex is provided in a step-by-step manner. No single design solution is correct for all situations. Maximum creativity is appropriate for all solutions!

Step-by-Step Design:
Step 1: Site Planning Questionnaire

A questionnaire, along with a site analysis, is used to initialize the step-by-step process of designing a Xeriscape landscape. The questionnaire will aid in determining many of the activities that occur on the apartment complex's grounds.

The external areas of the apartment complex site might be thought of as individual outdoor facilities, each will assigned functions similar to the special purposes of areas inside the buildings. The purpose of the questionnaire is to obtain pertinent information to help identify and characterize these outdoor facilities.

Following are some tips to assist in completing the questionnaire:

- Review the questionnaire completely before finalizing it.
- Try to have an existing site plan available when completing the questionnaire.
- Try to have strategically taken photos available of the entire project with you to avoid a lot of trips outside. A straight-on photo of each side of each building, among other key site features, would be very beneficial. The photos can also be referenced in the questionnaire if desired.
- Photos or notes of specially desired features observed at other apartment projects would also be beneficial when completing the questionnaire.
- Keep the "maintenance guy" hat on to help keep at least one foot on the ground!

LANDSCAPE DESIGN QUESTIONNAIRE

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

- **List colors preferred in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List colors not desired in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List new plant materials preferred in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List new plant materials not desired in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **Check off activities typical for the various areas of the apartment complex. Begin to consider how much space would realistically be needed to accommodate the activities:**

ACTIVITY	LOCATION(S)	COMMENTS
Outdoor Cooking		
BBQ/grilling		
Dining		
Other _____		
Gardening		
Annuals		
Herbs		
Perennials		
Vegetables		
Other _____		
Recreation		
Basketball		
Open field		
Parties		
Passive		
Tot lot		
Other _____		
Other _____		
Storage		
Building ____		
Building ____		
Building ____		
Building ____		
Maintenance		
Trash _____		
Trash _____		
Trash _____		
Other _____		
Parking		
Accessible		
Bicycles		
Motorcycles		
Vehicles		
Pet Areas		
Dog run		
Fenced		
Other _____		
Miscellaneous		
Clotheslines		
Fencing		
Other _____		
Other _____		
Other _____		
Other _____		

A copy of the Landscape Design Questionnaire is available at the end of this appendix.

Now is the right time for some real soul searching.

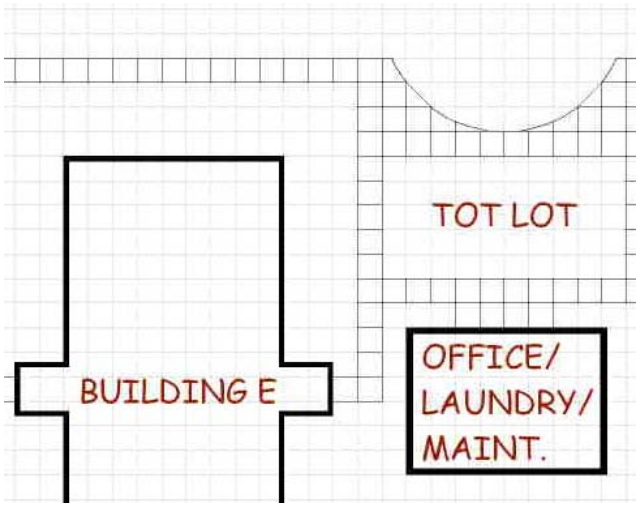
Since we are mainly talking about existing projects, we need to review their evolution and determine what has worked and what has not; what would be nice to lose and what would be nice to gain; what needs to stay put and what needs to move; what needs to be emphasized and what needs to be hidden; and so on.

It is recommended that, at this stage, the project be extensively walked in a visionary perspective. All projects have their strengths and weaknesses that can probably be better accommodated by some revisions to existing landscaping strategies. What if the trash enclosures were moved more downwind and closer to the access road? What if the “no man’s land” could be turned into a decent playing field? What if the parking lot could be restriped to locate parking for persons with disabilities closer to their apartments? What if the ugly old tree could be removed and open up a good vista to the south? What if a shaded area could be created next to the playground equipment? What if……

This is not a good time to hold back! Your next chance will likely be a long time away. Be creative. Even expensive propositions can be achieved to at least some degree for the greater glory of the tenants and the neighborhood.

Step-by-Step Design:
Step 2: Basic Site Plan & Site Features Analysis

This is where the drawing starts. Everyone has different abilities in this area but even the most elementary skills are all that are needed. These drawings are intended for internal consumption, so don't be shy. Will "stick figures" work? Certainly! Only, simply, very basic lines are



necessary. Of course a little graph paper, straight edges, and other tools may make your life easier!

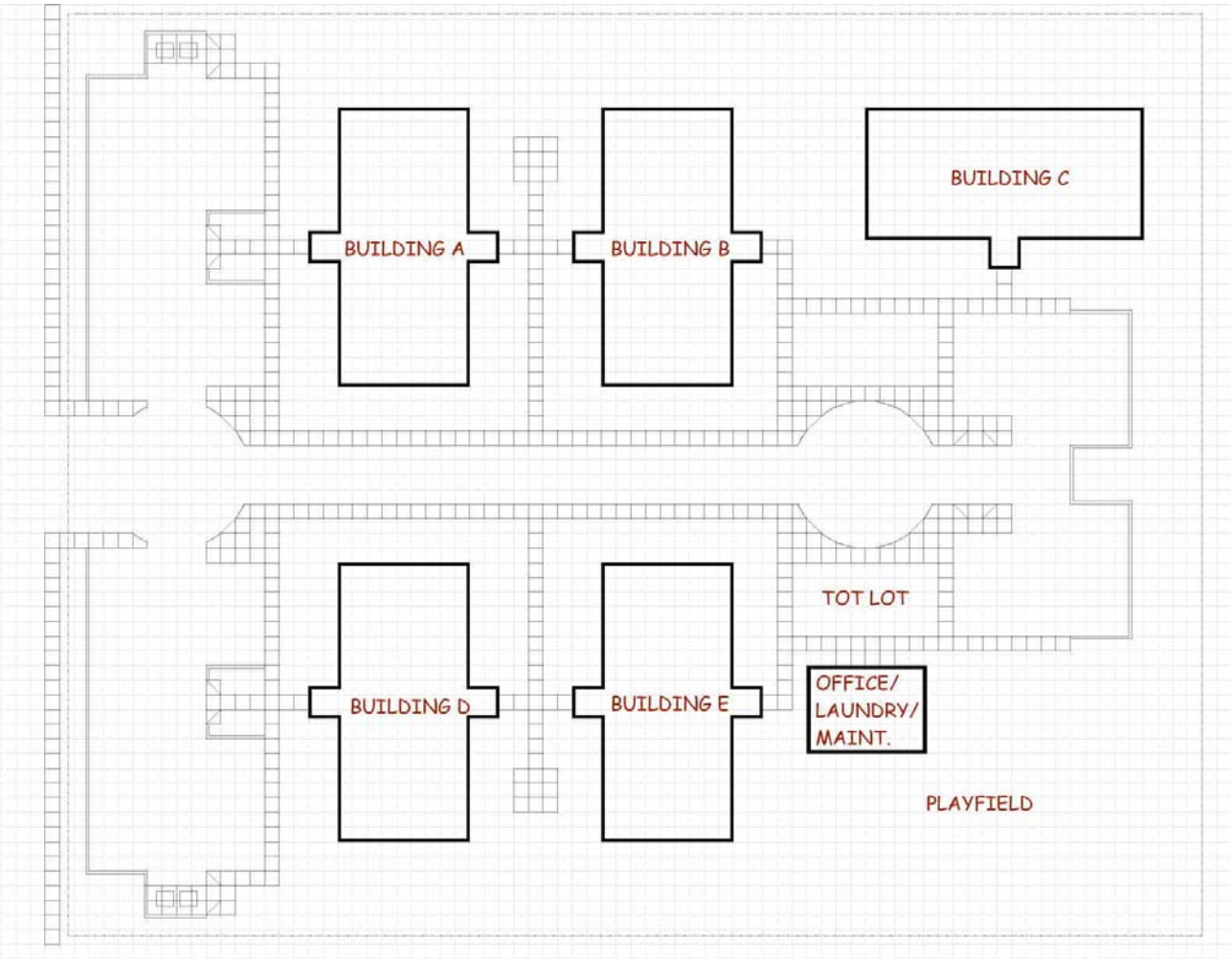
The first part of Step 2 encompasses the drawing of a very simple site plan to establish the existing situation and provide a baseline reference for the later stages of design evolution. Locate some gridded graphic paper and establish a scale for each representative grid (i.e. one grid equals 5 feet by 5 feet). Choose a scale which will permit drawing the entire complex on a single sheet of paper or several sheets of paper to be merged later, as desired.

Start measuring the footprints of pertinent site improvements with a large tape measure (in coordination with a compass, if needed) and begin recording them on the gridded site plan. Only reasonable accuracy is needed. Sometimes very useful existing tools, such as architectural and construction site plan drawings, may already be available to help simplify the task at hand.

The amount of drawing detail needed depends on the degree to which various site objects would be expected to be retouched by future relandscaping work. Conserve your efforts, but try to assemble as much useful information as can be easily gleaned.

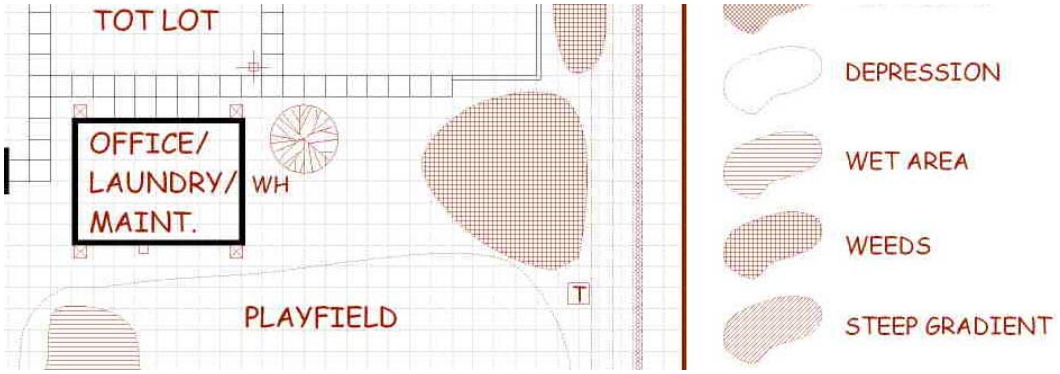
Think of this drawing as a horizontal slice through the entire complex at ground level. Following is a suggested list of site improvements and other key elements that should appear (to scale in most instances) on the basic site plan:

- Property lines
- Adjacent streets and alleys
- Building footprints
- Sidewalks and patios
- Streets, drives, and parking lots
- Trash collection and postal delivery areas

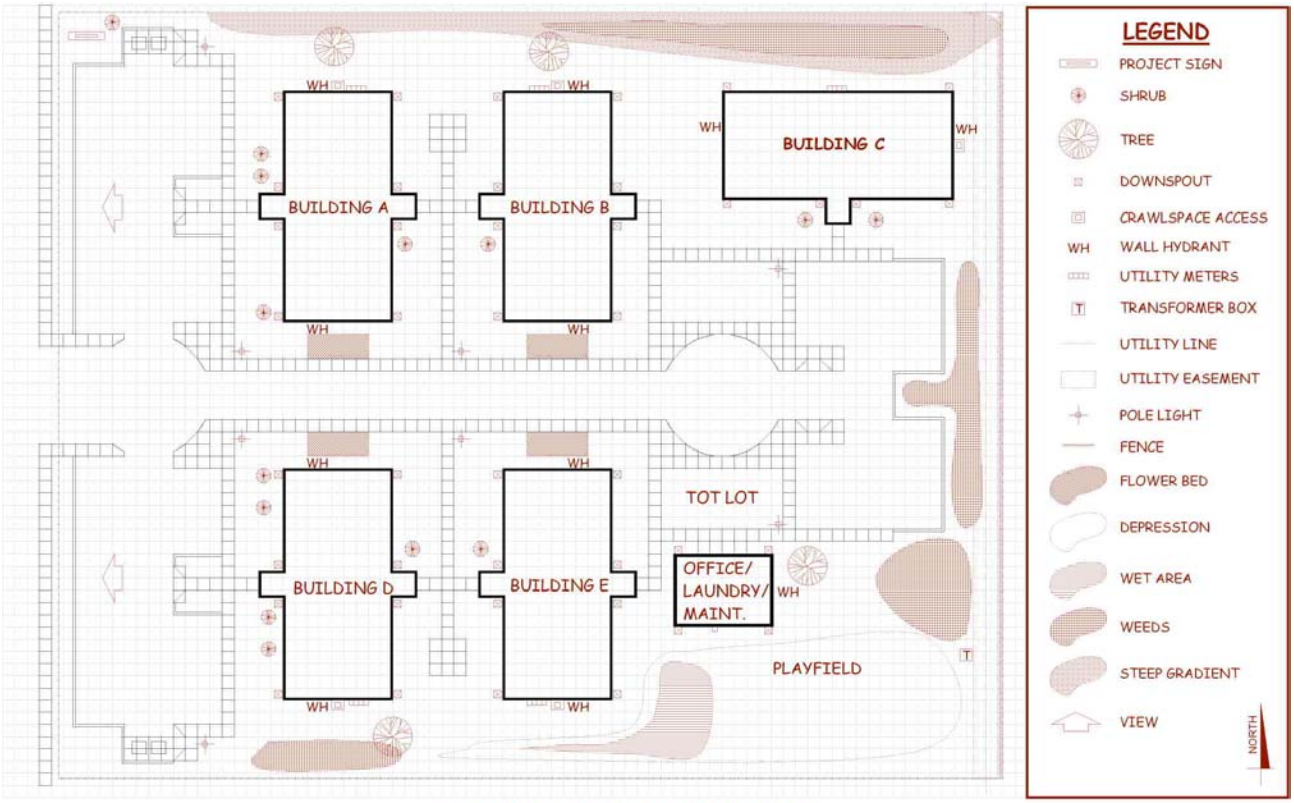


BASIC SITE PLAN

The second part of this exercise involves the further development of the basic site plan to document much more detailed information (i.e. drainage) which will also be very pertinent to full site analysis. Because the amount of information becomes so voluminous, it is recommended that a legend also be developed to limit the amount of written notes needed.



Think of this drawing as an overlay of the basic site plan. In the example below, this additional information has been delineated in a different line color to differentiate it from the underlying basic site plan information.

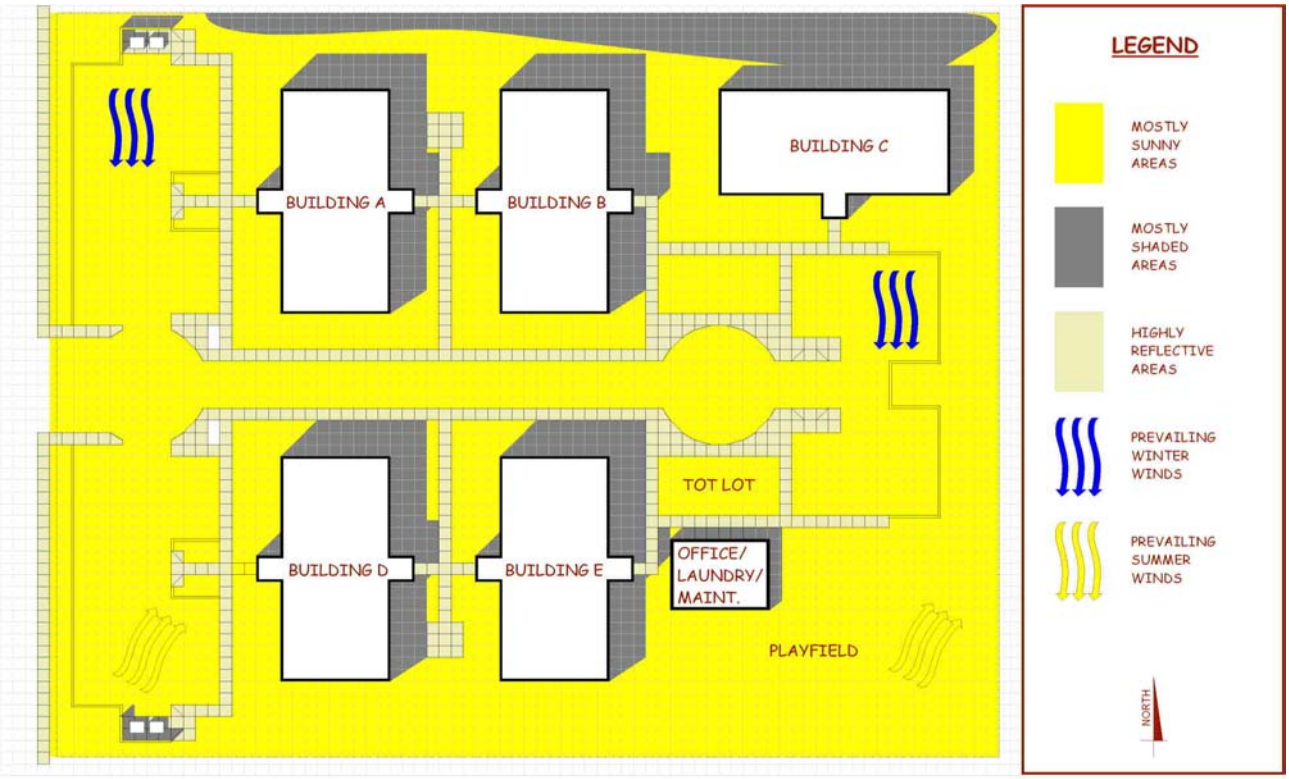


SITE FEATURES ANALYSIS

Step-by-Step Design:
Step 3: Site Climatology Analysis

Plants need sunlight to grow. Humans and plants interact differently to varying sun and wind conditions. Site climatology, thus, is one of the most fundamental elements of any proposed landscaping development strategy. The nature of the solar and wind conditions that are unique to the site are recorded in this phase as their effects can be both utilized and moderated by careful plant materials selection and placement. This is commonly only of the most neglected areas of concern in new project landscape designs (along with proper water and nutrient applications) leading to eventual failures. The Xeriscape landscape relies heavily on all these effects.

Concerning the drawing needed, its overlaying time again (with color markers, pencils, etc.)….. (Note the shading of drainage depressions.)

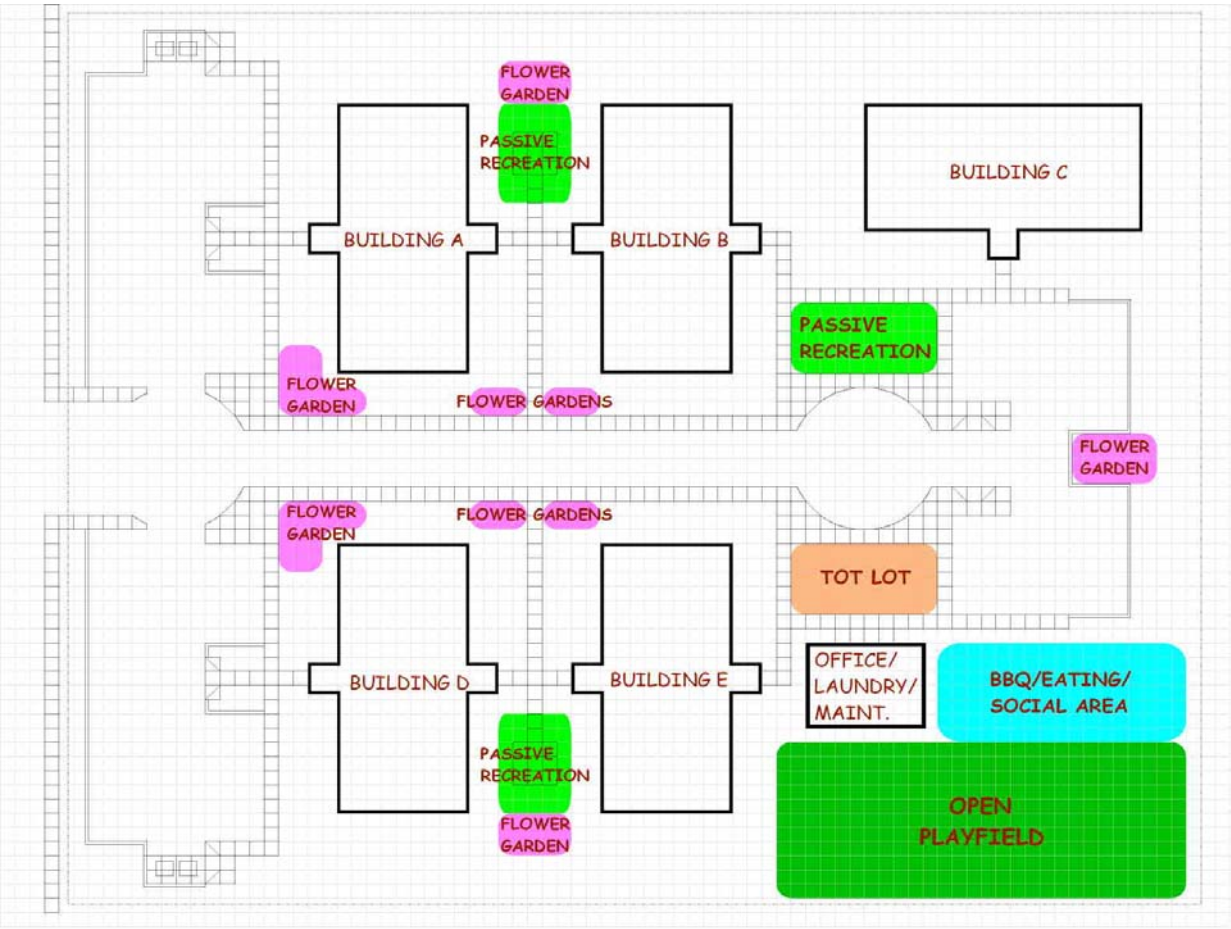


SITE CLIMATOLOGY ANALYSIS

Step-by-Step Design:
Step 4: Site Use Analysis: Desired Uses

It's brainstorming time again! The information recorded on the Landscape Design Questionnaire in Step 1 should now be reviewed; be coordinated with additional information recorded in Steps 2 and 3; and be graphically developed in an overlaid, conceptual, Site Use Analysis drawing. Key inputs in this decision-making process include:

- Design Questionnaire desired functional uses and aesthetics
- Existing site improvements constraints
- Environmental factors: solar, wind, watering, drainage, soils, etc.

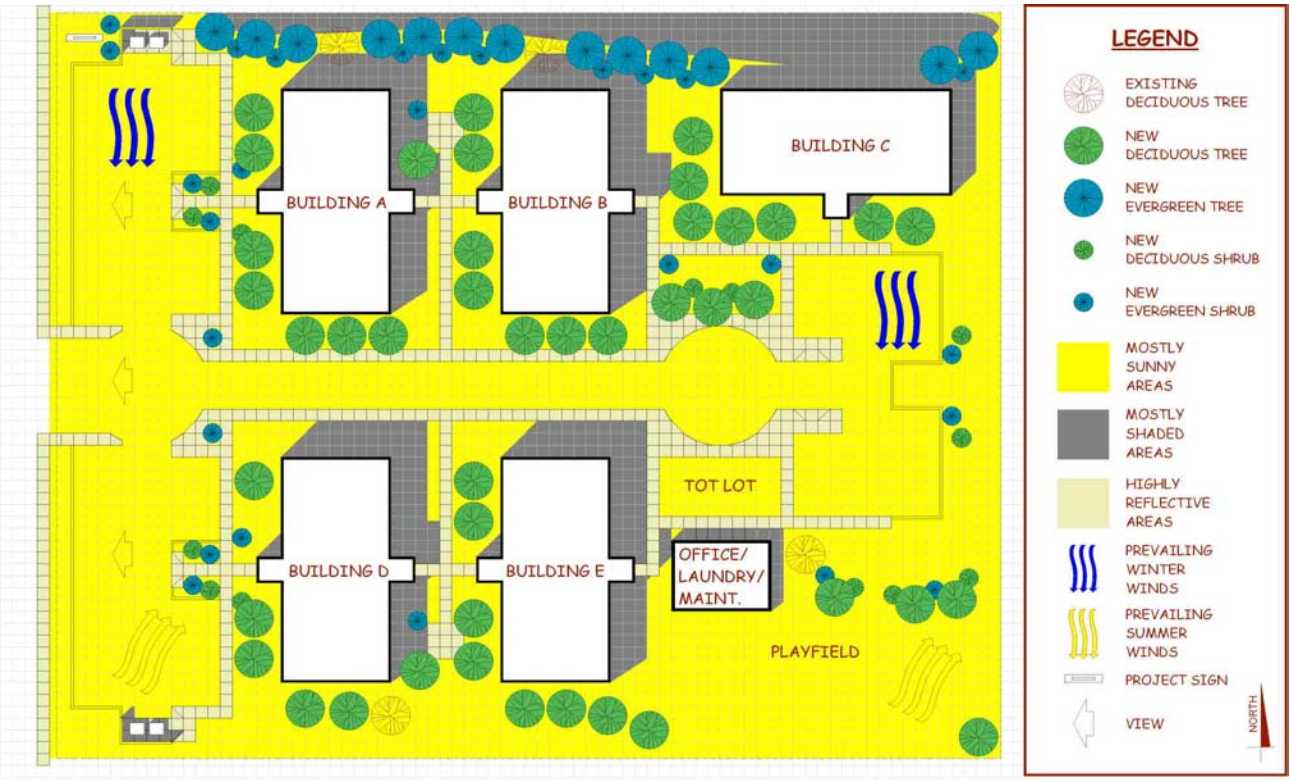


SITE USE ANALYSIS: DESIRED USES

Step-by-Step Design:
Step 5: Draft Tree & Shrub Planting Plan

Trees and shrubs form the vertical elements of landscaping compositions and can have direct effects on solar and wind emphasis and mitigation. This phase of the design process centers on their strategic material selection and placement for the mutual benefit of the project's users.

These plant materials fall into two categories: evergreen and deciduous. Evergreen trees and shrubs retain foliage year-round and help block winter winds. Deciduous plantings lose foliage during winter; allow winter sun through for site heating; and provide shading during the warm seasons. New tree and shrub selections and placements can augment the intentions of the Step 4 Site Use Analysis. Not all existing tree and shrub plantings absolutely have to be retained. It is recommended that soils analysis consultation be initiated at this stage of design development.

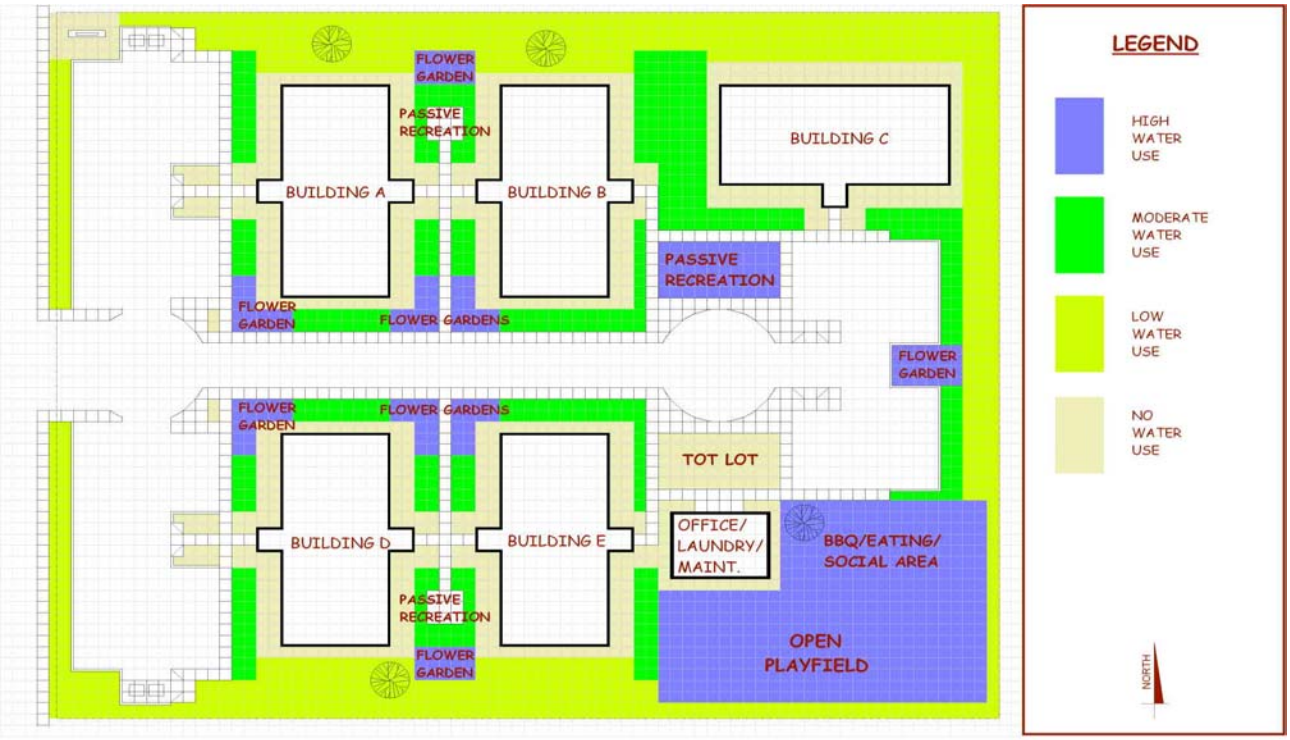


DRAFT TREE AND SHRUB PLANTING PLAN FOR CLIMATOLOGY

Step-by-Step Design:
Step 6: Site Hydrology Analysis

Future water zones should be determined for the Site Use Analysis before new plant selections and placements are finalized and to support existing plantings. Over-watering and under-watering are common causes of plant materials failures at existing projects. Xeriscape takes into account water availability from both pressurized and natural sources (roof drainage downspouts, drainage swales, springs, stormwater detention ponds, etc.) and recognizes that both should be considered. A low water requirement shrub, for example, should not be planted in the middle of a swale next to a roof drainage discharge point. Wear and tear should also be factored in.

Soil sub-drainage characteristics should also be evaluated in consultation with a professional at this stage of the design development as this aspect would also have a direct bearing on the success or failure of water zones.



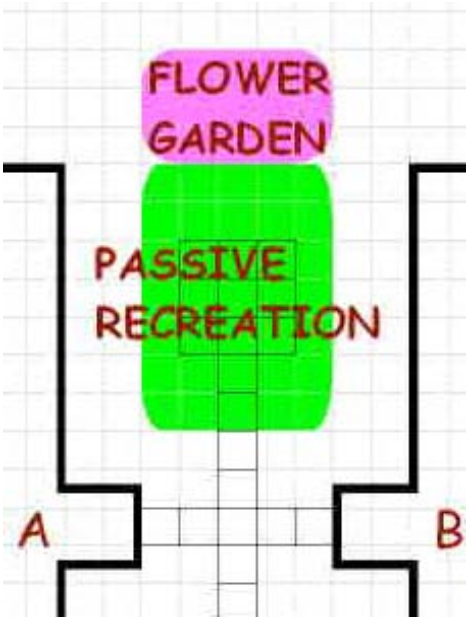
SITE HYDROLOGY ANALYSIS: DESIRED WATERING ZONES FOR GROUNDCOVERS

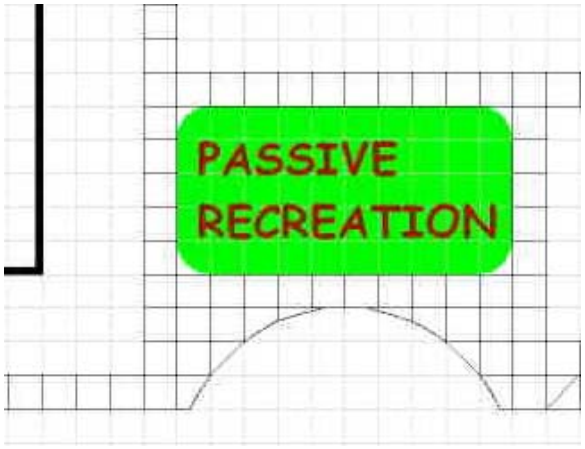
Step-by-Step Design:
Step 7: The Landscape Plan

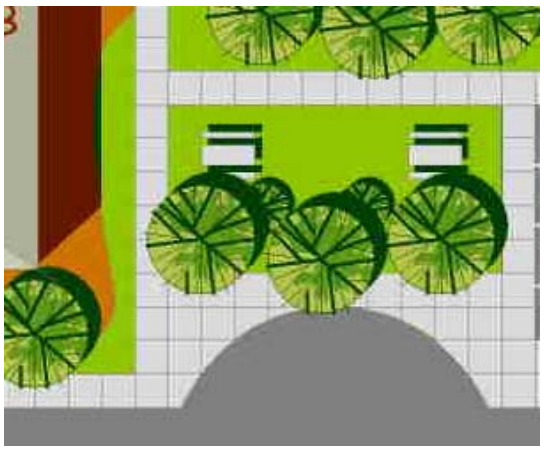
The sum-total of all the thought processes expended during the previous overlaying steps can now reach fruition with the drawing of the conceptual Landscaping Plan. Its purposes will be to assist in the design of a supporting irrigation system; to develop final plant selections; to denote where selected groundcovers will need to be installed; and to begin planting operations.

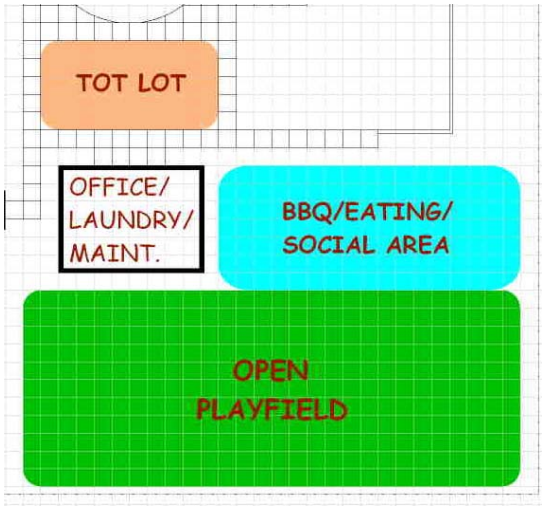
The Traditional Landscape, Western Landscape, and Gardener's Landscape, discussed earlier, are examples of vernaculars which might be employed to provide desired esoteric qualities compatible with the architecture and setting of apartment projects. The graphic case study employed the virtues of the Traditional Landscape.

Below are some visual illustrations of how the goals of the Site Use Analysis have been realized in the graphic case study…..

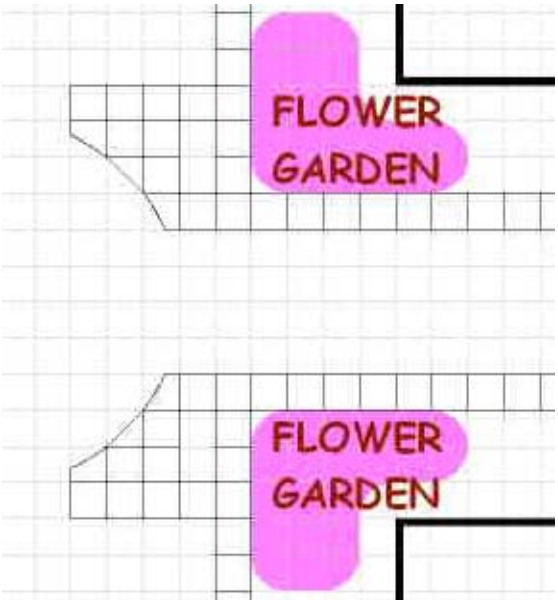


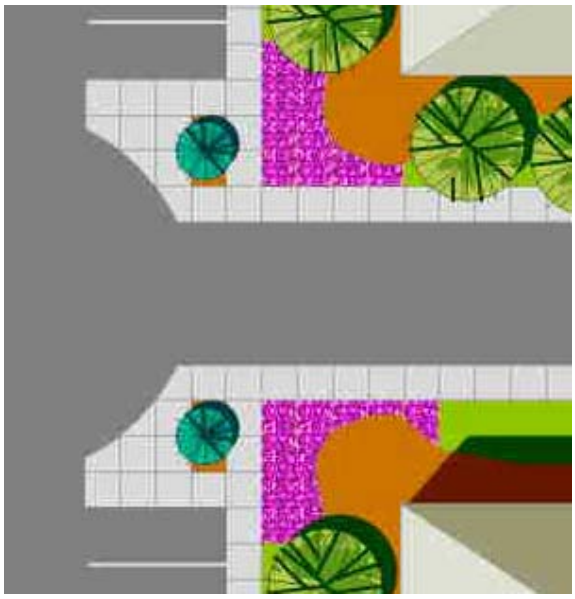

PASSIVE
RECREATION

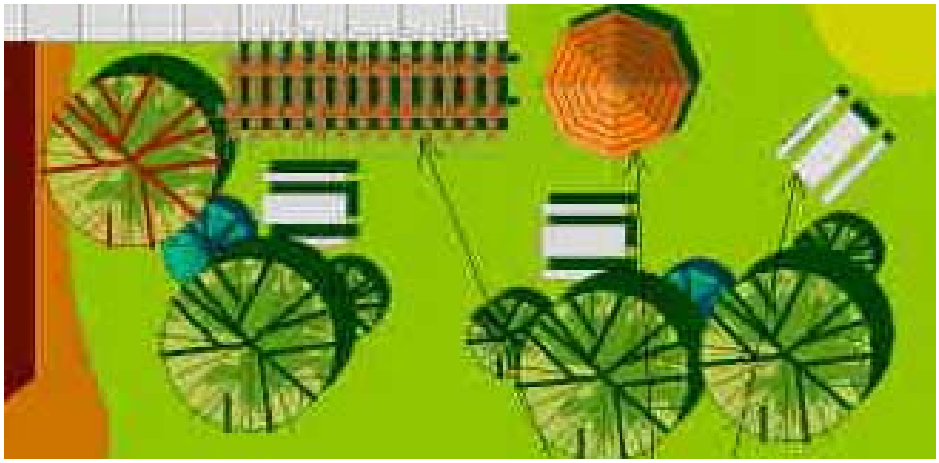



TOT LOT
OFFICE/
LAUNDRY/
MAINT.
BBQ/EATING/
SOCIAL AREA
OPEN
PLAYFIELD


TOT
LOT
OFFICE/
LAUNDRY/
MAINT.
PASSIVE RECREATIONAL
STRUCTURES: TRELLIS, BBQ,
BENCHES, GAZEBO, ETC.
PLAYFIELD


FLOWER
GARDEN
FLOWER
GARDEN





LANDSCAPE PLAN (TRADITIONAL LANDSCAPE SHOWN)

Step-by-Step Design:
Step 8: Landscaping Materials Selection

The previous steps developed the locations and types of landscaping materials desired that could be supported by the right combination of hydrology, soils characteristics, shading, traffic, and other factors. This step summarizes the results as a prelude to cost estimating.

Actual plant species selection involves an additional degree of research to accommodate these factors as well as many others, including climatic zone, visual aesthetics, maintenance, liability (i.e. Russian Olives have thorns), ultimate growth size, etc. It is important at this stage to seek the advice of those experienced in the industry. Many of these additional considerations are very clinical yet can be confusing to the novice (i.e. climatic zones vary depending on the source of the information). A listing of available consultants and other resources, from both within government and private industry, is provided at the back of this Appendix.

Groundcover selections are equally complicated as each prospective material offers both benefits and detriments. Various barks make excellent mulches, for example, but have lesser resistance to wind relocation than gravels. Gravels, on the other hand, offer different visual aesthetics and improved ballast but can cause more damage to building components and be less effective mulches. Again, the advice of professionals is recommended.

Irrigation systems vary, likewise, in specifications, performance, pressure requirements, options, and maintenance considerations. New systems and modifications to existing systems are usually designed for apartment projects by landscaping contractors and landscape architects based on coverage and water supply factors, among others.

All landscaping components vary considerably in price and, in the end, this will be a major consideration, so choose wisely.

On the following page is a useful chart for summarizing plant and groundcover materials selections. Additional copies of this chart are provided at the end of this appendix…..

PLANT AND GROUNDCOVER MATERIALS SELECTION CHART

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

- **Grasses:**

  _____
  _____
  _____
  _____

- **Hardscape (paving, bricks, concrete, etc.):**

  _____
  _____
  _____
  _____

- **Trees:**

  _____
  _____
  _____
  _____

- **Shrubs:**

  _____
  _____
  _____
  _____

- **Annuals:**

  _____
  _____
  _____
  _____
  _____

- **Perennials:**

  _____
  _____
  _____
  _____

Step-by-Step Design:
Step 9: Cost Estimating

What will it all cost?

The cost of plant materials and groundcovers must be identified, but so also must be ancillary materials and labor costs. Additional expenses, such as demolition, grading, excavation, mobilization, compaction, temporary dust and storm drainage control, paint restriping, water supply upsizing and connections, landscaping fabric installations, etc. must also be identified and included in the cost estimate.

The chart on the next pages provides a rudimentary method for tabulating most of these costs and should not be considered all-inclusive. There are additional copies of this chart at the end of this appendix…..

LANDSCAPE MATERIALS COST ESTIMATE

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

DESCRIPTION	UNIT COST	# UNITS	ITEM TOTAL
Site Preparation			
Demolition			
Dust control			
Earthwork			
Equipment rental			
Soils testing			
Storm water control			
Weed elimination			
Hauling & disposal			
Temporary trash removal			
Labor			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Soil Amendments			
Fertilizer			
Other conditioners			
Soil PH adjustments			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Grasses and Seeds			
Grass seeding			
Other seeding			
Sod			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Landscaping Fabric			
Fabric			
Other _____			
Other _____			
SUBTOTAL			

Plant Materials

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
SUBTOTAL			_____

Mulches

Gravel	_____	_____	_____
Wood bark	_____	_____	_____
Wood chips	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

Irrigation Equipment

Utility supply work	_____	_____	_____
Controls	_____	_____	_____
Zones	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

Hardscape Materials

Asphalt paving	_____	_____	_____
Concrete paving	_____	_____	_____
Edging	_____	_____	_____
Fencing	_____	_____	_____
Paint restriping	_____	_____	_____
Pavers	_____	_____	_____
Playground equipment	_____	_____	_____
Signs and posts	_____	_____	_____
Seating and tables	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

GRAND TOTAL COST _____

Special Considerations: Weeding

As a sage once said, “A weed is anything that grows where you don’t want it to.”

Eliminating undesirable plants would be one of the first goals of establishing the new Xeriscape landscape. Some of the resources listed at the end of this appendix should be consulted to determine the most accurate, affordable, and safe weed control practices for the apartment complex in question.

Weed removal by completely pulling out or digging out is considered the best way but obviously impractical for large areas of weeds. Following are some other options…..

Spraying: This is a toxic methodology and safe application is paramount. All herbicides should be applied in strict adherence with manufacturer’s printed instructions.

Mowing: Lawn mowers and weed whackers can remove the top portion of weeds. This methodology, if accomplished in a successful repetitive regime, can be successful as a prelude to rototilling in insuring that weed seeds will not be planted.

Rototilling: Rototilling, as a successor to mowing and if also accomplished in a successful repetitive regime, can insure that all remaining weeds are tilled into the soils.

The more effort that is expended with these processes can reduce the amount of weeding required in the future.

Special Considerations: Soil Types and Improvements

Soils types may vary across project sites and need to be properly identified for compatibility with the intended planting regime. It is recommended that soil samples be taken for categorization by either the National Resource Conservation Service (NRCS) or the Colorado State University Cooperative Extension Service (CES) prior to the selection of plant materials. These governmental agencies can perform relatively simple tests which could yield valuable information and avoid planting failures in the long run. Reference the resources listed at the end of this appendix in this regard.

Xeriscape landscape plantings will perform better if existing soils are modified to proper PH factors (especially the top two feet); loosened by rototilling (especially the top foot); and enriched with nutrients. Loosened soils will also improve soil water retention and reduce watering requirements. Existing soils can be "improved" by adding things to them and otherwise modifying them as discussed earlier and below.

Plants typically desire soil that is uniform in texture, minerals, air content, and organic matter throughout their root zones. To improve the structure (or tilth) of either clay or sandy soils, either aged manure or compost should be added. These additives also would benefit the soil by adding nutrients. Rototilling can also improve the soil's structure and may be the only thing needed for native plants. Good soil structure, in short, provides an optimal seedbed and excellent soil aeration.

The fertility of soils can be improved by adding fertilizers. The soils sampling and testing mentioned above would indicate what may be lacking and the NRCS and CES representatives could assist in determining what type(s) of fertilizer(s) should be used for proper soils modification. (Using plant materials native to the area of the project may eliminate the need for this step.)

The soils sampling and testing can also yield suggestions for altering the soils' PH either more acidic or more alkaline. Peat moss, ground bark, and sawdust can be used to increase its acidity. Lime can be added to increase alkalinity. (Again, using plant materials native to the area of the project may eliminate the need for this step.) When and how to add modifiers is discussed in the following sections…..

Special Considerations: Planting

Planting operations should follow weed elimination and soil modification operations. The main goal of planting new plants is to establish their root systems as quickly as possible. Whatever affects their roots will effect the entire plant. Soils act as the plant's foundation. The optimal planting times are considered to be the spring and the fall seasons.

Planting sod involves the following steps:

- Weed removal and initial soils modification
- Raking and removal of dirt clods
- Sod laying and stacking on steeper slopes
- Complete initial area saturation with watering
- Rolling with a lawn roller to remove air spaces under the sod layers
- Very light application of fertilizer
- Maintaining a moist sod layer until the grass has filled and there is no dead grass between the sod sheets
- Vigilant weed removal during the establishment period between the sod sheets

Planting grass seeds involves the following steps:

- Weed removal and initial soils modification
- Seed application by broadcast spreader at the seed supplier's suggested rate of coverage (even coverage is critical)
- Complete initial area saturation with watering
- Rolling with a lawn roller or light raking to insure seed have sufficient contact with the soils
- Very light seed coverage with organic matter (i.e. compost or aged manure) to retain moisture
- Maintaining a moist soil until the grass has filled in (may require watering two or more times a day in Colorado)
- Vigilant weed removal during the establishment period

Planting flower seeds involves the following steps:

- Weed removal and initial soils modification
- Soil surface raking to insure a level surface
- Seed planting in accordance with seed supplier's printed instructions

Planting larger plant materials involves the following steps:

- Soil surface raking to insure a level surface and dirt clod removal
- Marking precise locations of planting beds with rope, string, etc.
- Rototilling, weed removal, and initial soils modification within the planting beds
- Landscape fabric installation within the shape of the planting beds secured with fabric pins and sheets overlapped a minimum of three inches
- Landscape edging installation along the outside line of the planting beds if not adjacent to a hard surface such as a sidewalk
- Plant locating based on The Landscape Plan and marked with an “X” where each hole needs to be dug
- Digging the “right size” hole for the subject plant (the “right size” hole for trees and shrubs is considered to be about twice the width and 2 inches lower that the root ball; for annuals and perennials it is considered to be a few inches wider and deeper than the plants)
- Plant removal from containers (plants should never be taken out of their containers and left to sit in the sun and should never be pulled out by stems or leaves causing a destruction of the plants’ contact with root ball soils)
- Backfill soil improvement (soils just dug from the hole should be enriched with organic matter)
- Plant installation in the hole just deep enough so the top of the root ball will be approximately level with the level of the surrounding soils
- Hole backfilling with the enriched backfill soil
- Construction of a ridge of soil (basin) around the planting hole so water can be added
- Mulch installation (two to four inches deep in the basin to minimize evaporation; cool the soil; and inhibit weed growth) up to about one inch from the trunk of the plant
- Soaking the basin with water (all transplants require a healthy drenching) to the entire root zone

Special Considerations: Maintenance

Alongside installing new Xeriscape plant materials comes the responsibility for plant maintenance to insure healthy plants and longevity. Following are some general recommendations for improved maintenance practices…..

- Remove weeds before they get large and steal water and germinate
- Mow grass with sharp blades at a height which would remove no more than the top one-third of the leaf area of the grass blades
- Augment mulch around trees and shrubs to keep soil from becoming impacted; to retain moisture; and to prevent weed growth
- Selectively thin out crowded plants
- Water according to the prescribed water zones
- Aerate (the removal of small plugs of dirt) soils during the spring and fall, especially in high traffic areas of grass two to three times a year (it is recommended these areas be thoroughly watered two to three days beforehand)
- Fertilize grass several times per year (it is recommended the NRCS or CES be consulted for specific requirements in this regard)
- Prune trees and shrubs annually in accordance with CES guidelines for the specific plant materials

The following pages contain a suggested comprehensive seasonal checklist for properly maintaining Xeriscape plant materials. A copy is also provided at the end of this appendix.

COMPREHENSIVE SEASONAL MAINTENANCE CHECKLIST

Spring

- ❑ Fertilize bulb plants that were planted in the fall with a fertilizer high in nitrogen
- ❑ Check evergreens for browning; deciduous trees and shrubs for buds that died; and prune surgically
- ❑ Fertilize flowers, shrubs, and trees
- ❑ Plant flowers, shrubs, and trees at the appropriate time for the climatic zone
- ❑ Remove tree wrap from trees planted in the fall
- ❑ Rototill vegetable garden beds
- ❑ Plant and seed garden beds at the appropriate time for the climatic zone
- ❑ Rake remaining leaves, old fruit, and pine needles
- ❑ Rake and aerate Bluegrass and Tall Fescue lawns when there is no snow
- ❑ Fertilize lawns according to the appropriate schedule for the grass type
- ❑ Deep-water trees, shrubs, and roses as needed
- ❑ If plants are starting to bud out, gradually push back extra mulch over the next month
- ❑ Once the flowers on bulb plants have died, do not cut back the foliage until it has turned brown (usually over several months)
- ❑ Cut back perennials (except evergreens) from last year, if not already done
- ❑ Begin to control weeds
- ❑ Add extra mulch around flower and shrub beds to conserve moisture and keep down weeds
- ❑ Water plants, trees, shrubs, and lawns infrequently, but thoroughly
- ❑ Service the lawn and garden maintenance equipment

Summer

- ❑ Pinch off dead flower heads on annuals
- ❑ Continue to plant summer flowering bulbs
- ❑ Finish harvesting spring-planted cool season vegetables
- ❑ Mow the lawns to no less than 2-1/2 inches in height, never cutting more than one-third of the blade growth height
- ❑ Purchase bulbs for fall planting
- ❑ Closely supervise necessary water requirements based on evidence of stress, precipitation, wind, and other factors
- ❑ Weed frequently

Fall

- ❑ Plant new perennials
- ❑ Continue harvesting vegetables
- ❑ Begin monitoring weather forecasts regarding early frosts and cover plants if necessary
- ❑ Water as needed and avoid overwatering
- ❑ Plant hardy bulbs for spring blooming
- ❑ Fertilize and aerate lawns
- ❑ Mow lawns for the last time down to 2 inches high around mid-October

- **Wrap trunks of all young and tender-barked trees with commercially available "tree wrap" in mid to late October to prevent sun scalding**
- **Spade vegetable gardens and add organic matter that will break down over the winter period**
- **Deep water trees, shrubs, and roses as needed**
- **Mulch around plants**
- **Winterize irrigation systems**
- **Clean and store lawn and garden maintenance equipment**

Winter

- **Deep water trees, shrubs, and roses as needed, when the ground is not frozen**
- **Maintain mulch covering plants exposed to the south and southwest**
- **Gently brush heavy snows from trees and shrubs**
- **Prune away branches injured by ice and snow**
- **Prune fruit-bearing vines**
- **Water lawns one to two times per month, as necessary, when there is insufficient snowfall**

Special Considerations: Pest Control

Adhering to the suggested planting and maintenance recommendations discussed earlier will produce healthier plants which will be less likely to be attacked by disease or insects. Planting a variety of trees and shrubs is another suggested preventative measure. Certain species exhibit more natural pest resistance than others. Vegetable garden crops should be rotated from year to year to discourage a build-up of pests.

If these measures are unsuccessful, certain home remedies are available (i.e. spraying plants with a soapy water solution can kill some soft-bodied insects, such as aphids).

The use of pesticides should be considered a last resort due to their environmental unfriendliness. The CES may be consulted for more assistance with this problem.

Special Considerations: Irrigation

Plants should be irrigated only when they need water to promote water conservation and to discourage the growth of fungus and disease. To determine whether grass needs to be watered, someone should walk the lawns and check if their footprints are still identifiable after about one hour. If so, the grass should be watered.

Irrigation water should also be applied in concert with weather precipitation patterns and soil characteristics. Sandy soils are more porous and should be administered less water more frequently. Clay soils are less porous and should be watered more deeply less frequently.

The optimal watering time is considered to be between about 3:00 a.m. and 6:00 a.m. due to reduced evaporation rates and minimal thatch contact time (in the interest of discouraging the growth of fungus and disease).

Following is a chart of suggested irrigation rates and frequencies for the establishment and maintenance of various plantings…..

Low Water Zone

1st year	**Soak every two weeks**
2nd year	**Soak every three weeks**
3rd year	**Soak every four weeks**
4th year on	**Water only during extended dry periods**

Moderate Water Zone

1st year	**Soak every week**
2nd year	**Soak every two weeks**
3rd year on	**Soak every three to four weeks**

High Water Zone

1st year	**Soak twice a week**
2nd year	**Soak once a week**
3rd year on	**Soak every two weeks**

Established Grass Lawns

Kentucky Bluegrass/Ryegrass	**1 to 1.5 inches per week normally** **2 inches/week during hot, windy, dry weather**
Tall Fescue	**Depends on whether or not the root system has developed.** **Between 0.5 and 2 inches/week**
Buffalograss	**Brown color only desired: no requirement** **Green color desired: when starting to turn brown**

Resources

Numerous Xeriscape resources are available via governmental agencies, private consultants and contractors, periodicals and reference documents, and the Internet. Following are some starting points. Offices close and move frequently, so only main office contacts are listed.

U.S. Department of Agriculture
Natural Resource Conservation Service
Colorado State Office
655 Parfet Street, Room E200C
Lakewood CO 80215-5517
Voice: 720.544.2810, Fax: 720.544.2962
http://www.co.nrcs.usda.gov/

This federal agency operates a Denver metro area office as well as numerous field offices throughout Colorado which can provide technical support with respect to soils testing, soils improvement recommendations, and plant materials recommendations.

Colorado State University
Cooperative Extension Service
Cooperative Extension, 1 Administration Building,
Colorado State University, Fort Collins, CO 80523-4040
Voice: 970.491.6281; Fax: 970.491.6208
http://www.ext.colostate.edu/

This state university system operates numerous field offices throughout Colorado which can provide technical support with respect to soils testing, soils improvement recommendations, plant materials recommendations, landscape design, fertilizer application recommendations, irrigation recommendations, as well as recommendations for pest and disease control.

Local nurseries and seed companies

These private entities offer technical advice and products for specific Xeriscape climatic zones.

City of Denver
Denver Botanical Gardens
Denver Botanic Gardens
1005 York Street
Denver, CO 80206
Voice: 720.865.3500, Fax: 720.865.3713
http://www.botanicgardens.org

This city owned and operated facility offers 24-hour, toll-free counseling: 1.888.666.3063

Xeriscape demonstration sites

Some communities (i.e. City of Colorado Springs) maintain year-round Xeriscape demonstration gardens to promote water conservation.

http://www.csu.org/xeri/
Colorado Springs Demonstration - Use a map to visit the Colorado garden experiment. Learn objectives, study flora, review design concepts, use resources, or contact the garden.

Local mulch suppliers

Some saw mills, farms, and tree companies are sources for free or inexpensive mulches, such as sawdust and shredded trees.

Some sawmills, coffee shops, and breweries are sources for free or inexpensive soil modifiers, such as sawdust, coffee grounds, and hops.

Local hardscape suppliers

Some construction companies, fencing companies, and brick yards are sources for free or inexpensive demolished construction materials, demolished fences, and rejected, discontinued, or “seconds” bricks.

Other Internet sites

http://plants.usda.gov/gallery.html
USDA photos of plants

http://www.irrigationtutorials.com/install.htm
Drip irrigation tutorial

http://www.xeriscape.org/middle.html
Xeriscape Colorado - Non-profit group promoting water-efficient design and innovation

http://ndsuext.nodak.edu/extpubs/plantsci/landscap/h957w.htm
Xeriscape Plants and Ideas - Informative article from a North Dakota St. Univ. landscape architect. Explains Xeriscape concepts, and lists grasses, trees, and ground covers.

http://www.ag.usask.ca/cofa/departments/hort/hortinfo/yards/xeri1.html
Xeriscape Landscaping - University of Sasketchewan Horticulture Department paper details Xeriscape concepts. Discusses principles, planning, and soil improvement.

http://www.greenbuilder.com/sourcebook/xeriscape.html
Sustainable Building Sourcebook - Review Xeriscape reference material and resources. Explore commercial applications, implementation issues, design guidelines, and contacts.

http://forums.gardenweb.com/forums/swest/
Xeriscaping & Southwestern Gardening Forum - GardenWeb offers a landscaping bulletin board. Topics range from specific Xeriscape planning concepts, to general Southwest American gardening.

http://ag.arizona.edu/OALS/oals/dru/LWUintro.html
Low-Water Use Plants - Arizona Department of Water Resources lists drought-tolerant species. Find water needs for trees, shrubs, covers, cacti, grasses, and annuals.

http://www.xeriscapenm.com/
New Mexico Xeriscape Council - Review reference material from a Xeriscape gardening stronghold. Features contacts, event schedules, and a list of demonstration gardens.

LANDSCAPE DESIGN QUESTIONNAIRE

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

- **List colors preferred in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List colors not desired in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List new plant materials preferred in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **List new plant materials not desired in the final composition:**

  _____
  _____
  _____
  _____
  _____
  _____

- **Check off activities typical for the various areas of the apartment complex. Begin to consider how much space would realistically be needed to accommodate the activities:**

ACTIVITY	LOCATION(S)	COMMENTS
Outdoor Cooking		
BBQ/grilling		
Dining		
Other _____		
Gardening		
Annuals		
Herbs		
Perennials		
Vegetables		
Other _____		
Recreation		
Basketball		
Open field		
Parties		
Passive		
Tot lot		
Other _____		
Other _____		
Storage		
Building ____		
Building ____		
Building ____		
Building ____		
Maintenance		
Trash _____		
Trash _____		
Trash _____		
Other _____		
Parking		
Accessible		
Bicycles		
Motorcycles		
Vehicles		
Pet Areas		
Dog run		
Fenced		
Other _____		
Miscellaneous		
Clotheslines		
Fencing		
Other _____		
Other _____		
Other _____		
Other _____		

PLANT AND GROUNDCOVER MATERIALS SELECTION CHART

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

- **Grasses:**

  _____
  _____
  _____
  _____

- **Hardscape (paving, bricks, concrete, etc.):**

  _____
  _____
  _____
  _____

- **Trees:**

  _____
  _____
  _____
  _____

- **Shrubs:**

  _____
  _____
  _____
  _____

- **Annuals:**

  _____
  _____
  _____
  _____
  _____

- **Perennials:**

  _____
  _____
  _____
  _____

LANDSCAPE MATERIALS COST ESTIMATE

Project Name: _____
Project Location: _____
Project Owner: _____
Name of Preparer: _____
Date: _____

DESCRIPTION	UNIT COST	# UNITS	ITEM TOTAL
Site Preparation			
Demolition			
Dust control			
Earthwork			
Equipment rental			
Soils testing			
Storm water control			
Weed elimination			
Hauling & disposal			
Temporary trash removal			
Labor			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Soil Amendments			
Fertilizer			
Other conditioners			
Soil PH adjustments			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Grasses and Seeds			
Grass seeding			
Other seeding			
Sod			
Other _____			
Other _____			
Other _____			
SUBTOTAL			
Landscaping Fabric			
Fabric			
Other _____			
Other _____			
SUBTOTAL			

Plant Materials

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
SUBTOTAL			_____

Mulches

Gravel	_____	_____	_____
Wood bark	_____	_____	_____
Wood chips	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

Irrigation Equipment

Utility supply work	_____	_____	_____
Controls	_____	_____	_____
Zones	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

Hardscape Materials

Asphalt paving	_____	_____	_____
Concrete paving	_____	_____	_____
Edging	_____	_____	_____
Fencing	_____	_____	_____
Paint restriping	_____	_____	_____
Pavers	_____	_____	_____
Playground equipment	_____	_____	_____
Signs and posts	_____	_____	_____
Seating and tables	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
Other _____	_____	_____	_____
SUBTOTAL			_____

GRAND TOTAL COST _____

COMPREHENSIVE SEASONAL MAINTENANCE CHECKLIST

Spring

- ❑ Fertilize bulb plants that were planted in the fall with a fertilizer high in nitrogen
- ❑ Check evergreens for browning; deciduous trees and shrubs for buds that died; and prune surgically
- ❑ Fertilize flowers, shrubs, and trees
- ❑ Plant flowers, shrubs, and trees at the appropriate time for the climatic zone
- ❑ Remove tree wrap from trees planted in the fall
- ❑ Rototill vegetable garden beds
- ❑ Plant and seed garden beds at the appropriate time for the climatic zone
- ❑ Rake remaining leaves, old fruit, and pine needles
- ❑ Rake and aerate Bluegrass and Tall Fescue lawns when there is no snow
- ❑ Fertilize lawns according to the appropriate schedule for the grass type
- ❑ Deep-water trees, shrubs, and roses as needed
- ❑ If plants are starting to bud out, gradually push back extra mulch over the next month
- ❑ Once the flowers on bulb plants have died, do not cut back the foliage until it has turned brown (usually over several months)
- ❑ Cut back perennials (except evergreens) from last year, if not already done
- ❑ Begin to control weeds
- ❑ Add extra mulch around flower and shrub beds to conserve moisture and keep down weeds
- ❑ Water plants, trees, shrubs, and lawns infrequently, but thoroughly
- ❑ Service the lawn and garden maintenance equipment

Summer

- ❑ Pinch off dead flower heads on annuals
- ❑ Continue to plant summer flowering bulbs
- ❑ Finish harvesting spring-planted cool season vegetables
- ❑ Mow the lawns to no less than 2-1/2 inches in height, never cutting more than one-third of the blade growth height
- ❑ Purchase bulbs for fall planting
- ❑ Closely supervise necessary water requirements based on evidence of stress, precipitation, wind, and other factors
- ❑ Weed frequently

Fall

- ❑ Plant new perennials
- ❑ Continue harvesting vegetables
- ❑ Begin monitoring weather forecasts regarding early frosts and cover plants if necessary
- ❑ Water as needed and avoid overwatering
- ❑ Plant hardy bulbs for spring blooming
- ❑ Fertilize and aerate lawns
- ❑ Mow lawns for the last time down to 2 inches high around mid-October

- **Wrap trunks of all young and tender-barked trees with commercially available "tree wrap" in mid to late October to prevent sun scalding**
- **Spade vegetable gardens and add organic matter that will break down over the winter period**
- **Deep water trees, shrubs, and roses as needed**
- **Mulch around plants**
- **Winterize irrigation systems**
- **Clean and store lawn and garden maintenance equipment**

Winter

- **Deep water trees, shrubs, and roses as needed, when the ground is not frozen**
- **Maintain mulch covering plants exposed to the south and southwest**
- **Gently brush heavy snows from trees and shrubs**
- **Prune away branches injured by ice and snow**
- **Prune fruit-bearing vines**
- **Water lawns one to two times per month, as necessary, when there is insufficient snowfall**